

Empirical Analysis on the Determinants of Income Inequality in Korea

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Abstract

This paper reviews the trends and identifies the determinants of income inequality in Korea from 1980 to 2012. Both Kuznets' hypothesis of inverted U-shaped relationship between income inequality and economic growth and Barro's hypothesis of U-shaped relationship are not empirically supported. Macroeconomic index such as the government spending as a share of GNI was found to be statistically insignificant in affecting income inequality. The statistically significant negative estimate of the investment share in GDP shows that an increase in investment would decrease the income inequality. The statistically significant positive estimate of the variable for the share of the elderly in working population confirms the argument that the rise of aging population, which has been accelerating in Korea during the last two decades, is one of the important factors in widening the gap of income inequality.

Key words: *Income Inequality, Income Polarization, Determinants of Income Inequality*

1. Introduction

Korea has ascended from the destruction and shambles of Korean War in the 1950s to the 15th largest economy in 2011 in current U.S dollar GDP terms. The data from the Statistics Korea (formerly the Korean National Statistical Office) show that from 1982 to 2011, Korea's nominal (real) GDP has increased almost eighteen folds (five folds) and nominal GDP per capita jumped from mere \$1,927 to \$22,489. However, Korea's outwardly robust economy did not ameliorate the financial woes of the ordinary people and small-to-midsize companies who once represented Korea's thriving middle class. Lying beneath the economic success in the nation were dormant cries of distress among indebted households and financially-strapped small and medium enterprises (SME). Korean households are now facing record level of debts. The Bank of Korea Economic Statistics System reported that in March 2011, the total debt of Korean households reached 911.9 trillion KRW (\$792.3 billion)¹ surpassing the threshold of 900 trillion KRW for the first time.

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¹ At the exchange rate of \$1 = KRW 1,151 as of July 23, 2012

From 1999 to 2010, Korea's household debt has grown 11.7% a year on average, while its yearly GDP and disposable income on the average have grown 7.3% and 5.7%, respectively.² Korea's outstanding household debt increased 8.1% in 2011. Although this increase was lower than the 8.7% increase in 2010, GDP and the disposable income did not grow enough (5.4% and 4.8% respectively) resulting in an increase in the household debt to GDP ratio and the household debt to disposable income ratio from 2010 to 2011 (86.6% to 89.2% for GDP and 158% to 163.7% for disposable income). Swamped in heavy mortgage debts, those in their 30s and 40s are the most vulnerable group signaling that increase in their debt burden would trigger an onslaught of bankruptcy much like the housing crisis in the U.S. after the bubble burst. As the economic inequality in Korea has grown significantly over the past decade, the growing disparity is observed in major aspects of social life such as consumption pattern and educational opportunities [Koo 2007: 1].

Against the backdrop of this major change in Korean labor market, this paper aims to review the trends and investigate the determinants of income inequality in Korea, and adds to the existing literature by providing new evidence of the income inequality in Korea. Section 2 reviews the background and previous research evidence on inequality in Korea. Section 3 explains the trends in income inequality. Section 4 introduces an analytical model. Section 5 includes the details of data used in the empirical analysis, and empirical results. Section 6 concludes and provides policy implications and recommendations.

2. Income inequality in Korea

Some of the economic policies implemented to overcome the 1997 financial crisis had neo-liberal characteristics. Those policies such as pro-FDI policies and labor market reform also contributed to rising income inequality. The FDI inflow exacerbated the income inequality between skilled and unskilled workers. The revision of the labor law in 1998 also resulted in widening income inequality by allowing employers to terminate workers more easily than before [Park and Mah 2011]. The sharp decline in job stability experienced by Korean workers during the 1997 financial crisis never bounced back to the previous level. The recovery process was much slower for irregular, short-tenured or less educated workers, further reinforcing the polarization of job stability [Cho and Keum 2009]. A direct consequence of this is an increase in income inequality and the polarization of the income distribution.

Focusing on the relationship between economic growth and income inequality, Kuznets (1955) predicted that as economies develop, income inequality will first rise, reach the peak and fall after a certain critical threshold development stage and income level. Kuznets documented this argument using both cross-country and time series data. This inverted U-shaped pattern of income inequality (often measured by the Gini coefficient, a scale on which zero is perfect equality and one is perfect inequality) is known as the Kuznets curve, becoming one of the major stylized facts about long-run processes of economic development.

Income inequality in Korea has risen rapidly since the early 1960s when the government began to implement a series of five-year economic development plans. Consistent with the Kuznets curve, income inequality declined during the 1980s and until 1990s after reaching its critical peak. According to Fields and Yoo (2000: 139), the Gini coefficients based on Korea's labor income declined by 11 Gini points (or 27%) between 1976 and 1993. However, recent research findings consistently show that income inequality has rebounded sharply around late 1990s when Korean economy fell victim to the Asian financial crisis. Based on

² Trends of Household Debt and Strengthening Plan for Microfinance Assistance (July 19, 2012), Financial Service Commission & Financial Supervisory Service.

longitudinal data, the pattern of Gini coefficients was U-shaped for approximately two decades from early 1980s to late 1990s [Sung 2010 and references therein].

Changing demographics such as age structure also have affected income inequality. Korea, one of the most rapidly aging countries, has already seen its share of population over 65 years of age increase from 5% to more than 9% over the last 15 years. With an increase to 35% projected for 2050, median age in Korea will have increased 20 years to 55. By mid 21st century, Korea will even replace Italy as the world's second-oldest country [Hayutin, 2007]. The income inequality that the Korean elderly are experiencing is more severe than that of any other age group. According to Baeg and Kim (2012: 41), this severity is due to "divergent working patterns and low benefits from Social Security Policies." Sung (2010) looks into the effects of population aging on income distribution and statistical relationship between income inequalities and estimate their longitudinal change by focusing on the effects of quarterly income mobility on annual income inequality. The population aging in Korea was found to account for approximately 7.7% or 39.7% of total change in the Squared Coefficient of Variation (SCV) ratio between 1994 and 2009, depending upon the base-year income distribution condition. This finding implies that the annual income inequality could have been reduced by those amounts if the population aging had not occurred.

While the number of jobs has increased, those newly-created jobs are disproportionately concentrated in the small-scale establishments. From 2003 to 2008, over 80% increase in jobs was found in the establishments that hire fewer than 5 people. The average workers in the sector where the size of the firm is less than 5 workers earned only 46.7% of the wages of the workers in sectors where the firms hire 300 or more. The ratio increased from 43.6% in 2006, but the workers continue to make less than half. This trend of new job creation in small businesses has also contributed to the increase in income inequality.³

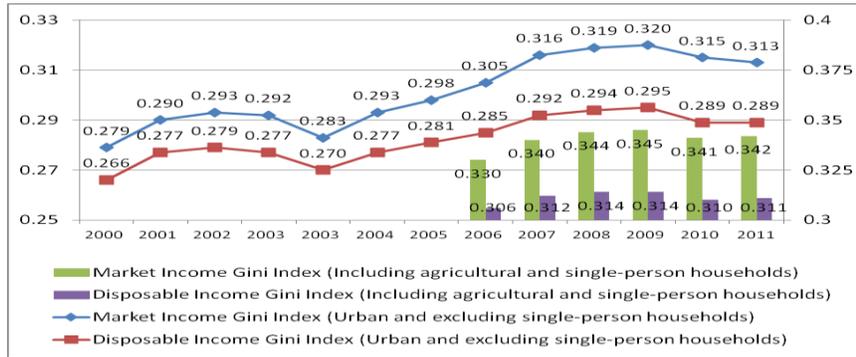
In response to the public efforts to reduce income inequality, research also look into the public policy implications on the magnitude of income inequality. Sung and Park (2011), for example, examine the redistributive effects of Korea's fiscal policies, including consumption taxes and in-kind benefits. Using the 2007 Household Income and Expenditure Survey, they found that taxes and transfers reduce income inequality in Korea by 13.8%. Sung and Park (2009) also find that contrary to the popular belief that implementation of direct taxes is the key in effective redistribution, in-kind benefits, direct taxes, and social security contributions all decrease the Gini coefficient by 6.7, 4.7 and 2.9 percentage points, respectively.

Before further ado, the distinction between income inequality and polarization is in order. Although these two concepts are sometimes used synonymously, Wolfson (1994: 354) showed that polarization and inequality are demonstrably different and also pointed out the potential problem of using the conventional scalar measures of inequality to assess the extent and trend in polarization. In Korean context, however, empirical evidence has shown mixed results. Shin and Shin (2007: 111) find that the polarization poses more serious problem than inequality on the income distribution. According to Shin and Shin (2007: 81), from 1997 to 2003 the polarization index based on Korean household total income increased by 67%~310% depending on the value of polarization sensitivity of the polarization index introduced in Esteban and Ray (1994). The corresponding Gini index increased only 7% during the same period. On the other hand, despite their conceptual differences, Yoo (2007: 47) found no significant statistical difference between relative income inequality index and polarization index.⁴

³ 2011 Population Survey for Economic Activities (Additional Surveys), Statistics Korea.

⁴ Yoo (2007: 35) pointed out that rounding errors in KLIPS may have deepened the clustering of income distribution, leading to overestimate the polarization index while the Gini coefficients are underestimated.

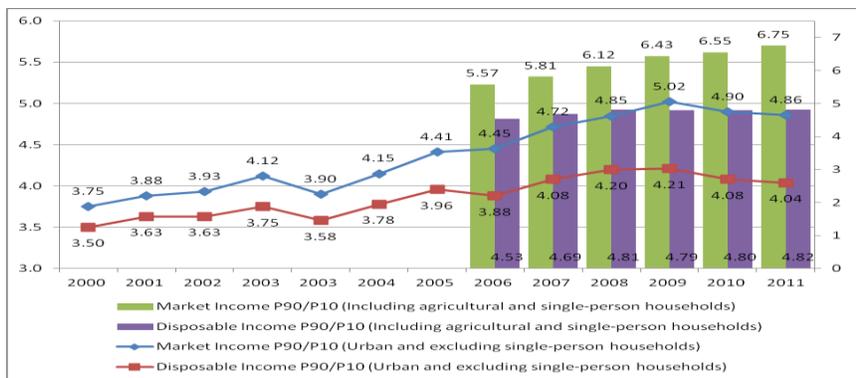
3. Trends in income inequality in Korea



Source: Statistics Korea (obtained from Korea Statistical Information Service)

Figure 1. Gini Index

Figure 1 shows the pattern of the Gini coefficients for four categories of income. In all categories, the Gini coefficients reached the maximum in 2009 and declined in 2010. For example, Gini coefficient for market income (urban and excluding single-person households) stood at 0.315 in 2010 after reaching 0.320 in 2009. The pattern shows an increase in income inequality after the Asian financial crisis, although the inequality somewhat declined in 2010. Other than the marginal increase of the Gini coefficients for market income of all households (from 0.341 and 0.342), the Gini coefficients for other categories further declined or remained the same from 2010 to 2011. Cho, Park and Kang (2012: 10) argue that the extent of actual income inequality is estimated to be worse than what the Gini index portrays. This argument is based on 1) the international comparison of the mean income of the lower-income households whose income is below the 60% of the median, 2) the evidence from the tax on aggregate income by the National Tax Service, and 3) the pattern of asset concentration in Korea.



Source: Statistics Korea (obtained from Korea Statistical Information Service)

Figure 2. Decile Ratio (P90/P10)

Figure 2 shows that the income gap between the rich (P90) and the poor (P10) consistently increased from 2006 to 2008 for all categories of income. The decile ratio (P90/P10) increased from 2009 to 2011 for both market income (from 6.43 to 6.75) and disposable income (4.79 to 4.82) when all households, including agricultural and single-person households, are considered. But when only urban and non single-person households, are

considered, the decile ratio declined for both market income (5.02 to 4.86) and disposable income (4.21 to 4.04).⁵

From 2009, income of the poor increased faster than that of the rich. For example, from 2009 to 2010, the market income and the disposable income of the bottom 10% (P10) increased approximately 8% (7.3% for all households and 8.4% for urban households) whereas income increase of the top 10% (P90) is lower at approximately 5.5%.

The decline of income inequality from 2009 to 2010 appears to be temporary. Several reasons were presented why the decline happened and why it is more likely to be temporary. Yoon (2010) argues that the Hope and Work Project implemented twice in 2009 and 2010 contributed to create jobs and generate labor income for lower-income workers. However, this Project was a limited-time employment policy, thereby only temporarily alleviating the financial hardship of the lower-income households but failed to continue the momentum of income inequality decline. Transfer payments, unemployment insurance and earned income tax credits also contributed to alleviate the hardship of the lower-income households. From 2009 to 2010, transfer income increased 20.8% (1.4%) for the income of the bottom (top) quintile.⁶ This transfer income also helped the lower-income workers boost their income.

The increase of absolute poverty rate is also problematic. The absolute poverty rate is the share of households whose inflation-adjusted income is lower than a certain income threshold or the number of households unable to afford certain basic goods and services. The absolute poverty rate of the urban working household (excluding single-person unit) consumption expenditure reached as high as 17.1% in 1999, right after the financial crisis and declined to 10.8% in 2000 and since then, it has hovered around 7% until 2008 when the absolute poverty rate shot up to 9.4% in 2009 before declining to 7.1% in 2010.⁷ This trend also confirms the widening income inequality until 2009.

One of the emerging concerns from the recent pattern of income inequality is that the contraction of the middle class and the widening income gap will shrink both domestic consumption and retard investment incentives, consequently weakening the growth potential of the Korean economy. Income inequality also can deteriorate social welfare through indirect channels. It was empirically found that widening gap of income inequality in Korea is positively related to the rate of crime and the rate of suicide [Cho, *et al.*, 2012: 69].

4. The analytical model

The following model⁸ is used to analyze the factors that affect the income inequality.

$$G_t = a_0 + a_1X_t + a_2X_t^2 + a_3Z_t + e_t$$

G is the Gini index for income inequality, X is the natural logarithm of GDP per capita [$X = \ln(GDP / Pop)$], Z is a vector of macroeconomic variables including the change of

⁵ In 2009 (2011), in individual equivalized disposable income, P10 amounts to KRW 688,428 (KRW 791,193) and P90 amounts to KRW 2,898,412 (KRW 3,194,677) for urban and non single-person household (Korea Statistical Information Service).

⁶ 2010 Survey of the Household Income and Expenditure, Table 1.4, Statistics Korea

⁷ The data for absolute poverty for all households (excluding agri/fishery and single-person households) is available from 2003. The comparison of statistics reveals that the absolute poverty rates for all household are greater than those of urban household by approximately 3.5 percentage points. For example, the absolute poverty rates of all households (urban households) were 13.3% (9.7%) and 10.0% (7.4%) in 2009 and 2010 respectively (2011 Poverty Statistics Yearbook by the Korea Institute for Health and Social Affairs 2011: 8-9). Therefore, the absolute poverty rate of all households in 1999 is conjectured to be approximately 20.5%.

⁸ The model is similar to the one used in Barro (2000) and Gregorio and Lee (2002). Mah (2001) also used this model for Korean context.

population structure, the degree of trade openness, and the proxies for labor market including the unemployment rate and employment status. In relation to the analytical model of this type, Kuznets (1955) argued that as countries develop income inequality first increases in the early stage of economic growth and decreases when the economy reached the mature stage. This implies an inverted U-shaped relationship between income inequality and economic growth. If the Kuznets' inverted U-curve hypothesis is valid, then $a_1 > 0$, $a_2 < 0$. If this hypothesis is invalid and the income inequity decreases as national income rises as the economy grows, then $a_1 < 0$, $a_2 = 0$.

As opposed to Kuznets, Barro (2000) argued that the income inequality decreases in the early stage of economic growth and increases when the economy attains a certain level of economic growth. If Barro (2000)'s hypothesis of the U-shaped relationship between income inequality and income curve is valid, then $a_1 > 0$, $a_2 > 0$. Other important determinants of income distribution include macroeconomic variables, changes in household structure, degree of urbanization, and extent of openness and globalization.⁹ Macroeconomic factors include the CPI growth rate (ΔCPI), Investment to GDP ratio (IY) and Government spending to GDP ratio (GY).¹⁰ Labor market indexes include unemployment rate (Unemp), Female employment rate (Emp_f) and Self-employment rate (SelfEmp). The indexes for the changes in the household structure include the percentage of population over 65 to working-age population (OLD), the ratio of middle school students (MidSt). Share of agriculture in GDP is used as a proxy for urbanization.

Finally, the ratio of trade volume to GNI (XMY), Import (MY), or the amount of Foreign Direct Investment [$\ln(FDI)$] can be used as measures of globalization. These measures' impact on the income inequality varies depending on the hypotheses. Since Korea, compared to other developed countries, is more abundant in labor than in capital, the Stolper-Samuelson Theorem applies.

The estimated coefficient of the share of trade to GNI is expected to be negative since the abolishment of trade barriers to promote globalization increases the merchandise trade, which in turn raises the demand for the products manufactured by unskilled labor and unskilled labor itself. However, compared to China and other South East Asian countries to which Korea has expanded trade, Korea is relatively abundant in skilled labor. As a result, trade openness will raise the demand for skilled labor and decrease the demand for unskilled labor in Korea, possibly due to competition with China and South East Asian countries. In this case, the estimated coefficient of the trade openness variable is expected to be positive, implying that trade openness will exacerbate the income inequality.

The effects of FDI, another measure of globalization, on income inequality are theoretically ambiguous and inconclusive. Obstfeld (1998) argued that the influx of FDI from developed countries to developing countries would alleviate the income inequality by raising income from employment creation, transfer of advanced technology, improvement of labor productivity through the adoption of advanced management techniques.

However, despite all the virtues of FDI mentioned above, Graham and Krugman (1995: 60) argued that FDI can exert a negative impact on the domestic economy by hampering independence and jeopardizing the national security of the receiving countries, inducing unemployment, worsening the trade deficit, and distorting the production and employment structures. Graham and Krugman (1995) also emphasized that FDI into developing countries

⁹ For more details on the determinants of income inequality, refer to Yoo (2012)

¹⁰ There is an intense debate over the relationship between welfare spending and growth. One view is that welfare spending reduces income inequality and thus leads to growth. The opposing view is that unproductive welfare spending results in tax increases and thus hurts economic growth [Sung and Park 2011].

would expand the income gap between skilled and unskilled labor thereby deepen the income inequality by raising the demand for skilled workers.

5. Data and Empirical Results

In order to investigate the determinants of the income inequality in Korea, this paper uses annual macroeconomic series from 1980 to 2012 obtained from the following sources: ECOS of the Bank of Korea and KOSIS of the Statistics Korea. Gini index is used for the degree of income inequality among other measures such as income decile (or quintile) ratio, poverty rate and labor income decile or income quintile ratio, labor share.¹¹ As mentioned earlier, the Gini index was computed by using the urban household income despite several drawbacks since there are no better alternatives.¹² For the index of globalization, the share of trade volume (export + import) in GNI and the share of import in GNI are used. Finally, the share of FDI to GDP was computed by using the Foreign Capital Inflow data at the Bank of Korea. Table 1 and Table 2 list the definitions of the variables and their descriptive statistics. The correlation coefficient matrix among the variables shows relatively high correlation between the Gini index and the share of trade volume to GNI¹³.

Table 1. Variable Definition

| Variable | Description | Definition |
|--------------------------------------|-------------------------------------|--|
| X | Nominal GDP per capita (in Won) | $\ln(\text{GDP}/\text{pop})$ |
| ΔCPI | Yearly consumer price growth rate | $\% \Delta\text{CPI}$ |
| OLD | Share of elderly population | Pop over 65 / working-age pop |
| MidST | Share of middle school students | Middle school students / school-age pop |
| AggPr | Growth rate of agricultural product | $\% \Delta$ in agricultural production |
| Unemp | Unemployment rate | Unemployed / working-age pop |
| Emp_f | Female employment rate | Female employment / working-age pop |
| SelfEmp | Share of self employed | Self-employed / employed |
| $\ln(\text{FDI})$ | Foreign direct investment | $\ln(\text{FDI})$ |
| XMY | Trade openness | $(\text{Export} + \text{Import}) / \text{GNI}$ |
| MY | Share of import | $\text{Import} / \text{GNI}$ |
| IY | Share of investment | $\text{Investment} / \text{GDP}$ |
| GY | Share of government spending | $\text{Government spending} / \text{GNI}$ |

¹¹ Although asset and wealth inequality is more appropriate than income inequality to represent the inequality in distribution, due to the lack of data on asset and wealth, this paper uses the Gini index for the measure of the inequality in distribution.

¹² A large number of observations available for over 30 years, suitable for a long-term trend analysis, is the main advantage of using the Urban Household Income and Expenditure data from the Statistics Korea. However, a major disadvantage of this data is that it fails to include information for agricultural households, single-person households, and income of the self-employed.

¹³ The correlation coefficient matrix table is not included to save space. The table is available upon request.

Table 2 Descriptive Statistics

| Variable | No. of obs | Mean | Std. Dev. | Min | Max |
|--------------|------------|-------|-----------|-------|-------|
| X | 41 | 5.72 | 1.69 | 2.20 | 7.77 |
| Δ CPI | 46 | 0.08 | 0.07 | 0.01 | 0.29 |
| OLD | 46 | 8.15 | 2.86 | 5.60 | 15.20 |
| MidST | 46 | 0.19 | 0.01 | 0.16 | 0.21 |
| AggPr | 40 | 0.02 | 0.06 | -0.17 | 0.15 |
| Unemp | 46 | 0.04 | 0.01 | 0.02 | 0.07 |
| Emp_f | 46 | 0.44 | 0.04 | 0.35 | 0.49 |
| SelfEmp | 31 | 0.00 | 0.00 | 0.00 | 0.00 |
| ln(FDI) | 46 | 20.06 | 2.61 | 15.26 | 23.64 |
| XMY | 41 | 0.69 | 0.15 | 0.39 | 1.11 |
| IY | 41 | 0.26 | 0.04 | 0.18 | 0.35 |
| GY | 41 | 0.12 | 0.02 | 0.09 | 0.16 |

To identify the factors in determining the income inequality, we tested for the stationarity of all time-series data used. For the stationarity test, we utilize the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests.¹⁴ The data was found to be non-stationary as the null hypothesis of a unit root test for the data series was not rejected. Therefore, the use of regression on level variables would produce spurious relationship and weaken the power of testing hypothesis.¹⁵

Even though individual variables are nonstationary, it is possible for the linear combinations of nonstationary variables to be stationary or cointegrated if a long-run equilibrium relationship exists among a set of variables. To see if the variables are cointegrated, we conduct two tests. The Engle-Granger (EG) two-step method tests for cointegration by using residuals given that if two time series are cointegrated, a linear combination of them must be stationary. The residuals are obtained from the cointegrating regression in the first stage. In the second stage, DF or ADF unit root tests for stationarity are applied on the residuals. This research uses the DF and DF-GLS unit root procedures to test the presence of a cointegrating relationship.¹⁶ Unlike the Engle-Granger method, the Johansen test is a test for cointegration that allows for more than one cointegration relationship.¹⁷

DF-GLS in Table 3 lists the second-stage cointegration statistics. The results of these statistics show that the null hypothesis of residuals' having unit root can be rejected in all regression models, confirming the existence of a long-run relationship among the variables. The contents in Table 3 are summarized as follows. First, the positive estimates of the squares of GDP per capita, one of them being statistically significant at 1% level, seem to support the Barro's hypothesis of U-shaped relationship between income inequality and economic growth.

¹⁴ Details of unit root tests' results are available upon request.

¹⁵ To minimize the potential problem of using non-stationary data, we apply a stricter rule by using 1% statistical significance on the estimates.

¹⁶ DF-GLS test, proposed by Elliott, Rotenberg, and Stock(1996), is essentially an augmented DF except the series is transformed via a GLS regression before performing the test. They show that this DF-GLS test has greater power than the previous versions of the ADF test.

¹⁷ Refer to Cin (2001) for more details on the cointegration testing procedures.

Second, such macroeconomic measures as the rate of GDP growth (% Δ GDP) and the share of government spending in GDP (GY) are found not to affect the income inequality. On the other hand, the negative estimates of the share of investment in GDP (IY), four out of five being statistically significant at 10% level or less, show the role of investment in reducing income inequality. All estimated coefficients for CPI inflation are found to be negative and all of them except two are statistically significant, which indicates that inflation might be a “progressive tax in that the poor and middle classes lose relatively less than the rich” as Blinder and Esaki (1978) asserted.

Table 3. Determinants of Income Inequality by OLS

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|
| X | -0.181*** (0.028) | 0.003 (0.036) | 0.071 (0.064) | -0.032 (0.036) | -0.014 (0.034) | -0.003 (0.035) | 0.014 (0.033) | 0.046 (0.063) |
| X² | 0.015*** (0.002) | -0.003 (0.003) | -0.007 (0.005) | 0.001 (0.003) | -0.001 (0.003) | -0.002 (0.003) | -0.003 (0.003) | -0.005 (0.005) |
| d97 | -0.026** (0.011) | -0.007 (0.005) | -0.007 (0.005) | -0.014*** (0.005) | -0.012** (0.005) | -0.014*** (0.005) | -0.013*** (0.005) | -0.014*** (0.005) |
| ΔCPI | | -0.093*** (0.025) | -0.046 (0.031) | -0.071** (0.029) | -0.074** (0.031) | -0.062** (0.028) | -0.066** (0.028) | -0.053* (0.031) |
| OLD | | 0.014*** (0.002) | 0.015*** (0.002) | 0.008** (0.003) | 0.010*** (0.003) | 0.010*** (0.003) | 0.012*** (0.002) | 0.010*** (0.003) |
| MidST | | -0.270*** (0.084) | -0.239*** (0.088) | -0.228** (0.101) | -0.230** (0.107) | -0.225** (0.096) | -0.226** (0.099) | -0.196* (0.104) |
| AggPr | | -0.015 (0.015) | -0.019 (0.014) | -0.021* (0.012) | -0.018 (0.013) | -0.020* (0.012) | -0.019 (0.012) | -0.027* (0.014) |
| Unemp | | 0.268*** (0.097) | | -0.190 (0.151) | | -0.156 (0.148) | | -0.181 (0.166) |
| Emp_f | | | -0.190** (0.085) | | 0.043 (0.115) | | 0.061 (0.112) | |
| SelfEmp | | | 30.909** (13.292) | | | | | 12.311 (15.171) |
| ln(FDI) | | | | 0.004 (0.004) | 0.002 (0.003) | 0.004 (0.003) | 0.002 (0.003) | 0.003 (0.004) |
| XMY | | | | 0.030* (0.016) | 0.030* (0.017) | | | |
| IY | | | | -0.079* (0.047) | -0.062 (0.049) | -0.099** (0.046) | -0.091* (0.049) | -0.093 (0.060) |
| GY | | | | 0.111 (0.242) | -0.008 (0.231) | -0.036 (0.259) | -0.153 (0.244) | 0.036 (0.291) |
| MY | | | | | | 0.061** (0.029) | 0.067** (0.030) | 0.070** (0.034) |
| \bar{R}^2 | 0.729 | 0.942 | 0.957 | 0.963 | 0.960 | 0.964 | 0.963 | 0.963 |
| DW | 0.37 | 1.27 | 1.55 | 2.13 | 1.93 | 2.14 | 2.05 | 2.25 |
| DF-GLS | -2.91* | -3.12** | -4.00*** | -4.27*** | -4.62*** | -4.25*** | -4.52*** | -4.27*** |

Standard errors in parentheses

***, **, *: 1%, 5%, and 10% statistical significance respectively

Third, the estimated coefficients for the share of elderly in the working population (OLD) are positive and statistically significant, indicating that population aging would increase the income inequality. This result is consistent with the argument that the accelerating trend of

population aging is one of the most important determinants in deepening income inequality in Korea. Fourth, the role of education in reducing income inequality is substantiated by the negative estimates, all of them being statistically significant, of the share of middle-school students in the school-age population.

Fifth, the estimates of the variable controlling for urban concentration and the urban-rural gap (AggPr) in production are found to be negative, three out of six being statistically significant, showing that an increase in agricultural production would reduce the income inequality. An inference from this finding is that the expansion of FTA with many partners at the same time (multi-faceted) may exacerbate the income inequality in the future.

Sixth, one of the estimated coefficients for unemployment is positive and statistically significant, implying that unemployment exacerbates the income inequality in Korea. The notion that an increase in female employment would reduce income inequality is supported by the negative and statistically significant estimates of female employment variable (Emp_f).

Seventh, the estimates of the variables for openness (both XMY and MY) are positive and statistically significant, implying that the trade expansion would increase the income inequality. This result runs counter to that of Mah (2003) and the implication of the Stolper-Samuelson Theorem that trade liberalization reduces income inequality in developing countries. In addition, the impact of the share of trade volume to GDP was found to be statistically insignificant in An (2003). On the other hand, Kwark and Kim (2008) found that the income inequality is reduced by the trade dependence. We conjecture that this inconsistency arises due to the differences in the measure of openness.¹⁸ Another possibility is that the change in the share of GNI is more sensitive to the recession since compared to GDP, GNI includes trade balance that may vary as the terms of trade changes, and net factor income.¹⁹

Eighth, according to Obstfeld (1998), the influx of FDI would improve income distribution by expanding labor demand. However, the estimates of the FDI variable are positive, but not statistically significant, meaning that in Korean context, the influx of FDI may not necessarily generate such beneficial effects as employment creation, transfer of advanced technology and management skills that contribute to increase the productivity and promote economic growth. Lastly, the estimates of labor market measures such as unemployment, female employment and self employment were found to be negative, some of them being statistically significant.

The DW statistics in Table 3 show that these estimated results may have been distorted due to the presence of serial correlation. In order to correct this problem, Cochrane-Orcutt GLS was used. The empirical results are reported in Table 4. Although the empirical results in table 4 are similar to those in Table 3, two differences are worth mentioning. First, all estimated coefficients for squared GDP per capita are negative and statistically insignificant. This result means that neither Barro's U-curve hypothesis nor Kuznets' inverted U-curve hypothesis are supported. Similar findings were reported by Mizogucci (1980), Mah (2001), and An (2003). Second, all estimated coefficients for investment ratio turn out to be statistically significant, indicating that an increase in investment would play an important role in reducing the income inequality.

¹⁸ The share of trade volume to GDP may not be an appropriate measure for openness as two countries with same GDP can implement different policies regarding tariff and non-tariff barriers (OECD, 2005). Rodriguez and Rodrik (1999) and Wade (2004) also criticized the practice of using the share of trade volume to GDP as a measure of openness.

¹⁹ In fact, the real growth rate of GNI has been lower than that of GDP after mid 1990s. The gap in growth rates may have arisen due to the deterioration of terms of trade and insufficient domestic demand. For more details, refer to Hwang (2007).

Table 4. Determinants of Income Inequality by GLS

| | Model1 | Model2 | Model3 | Model4 | Model5 | Model6 | Model7 | Model8 |
|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| X | -0.050 (0.043) | -0.065 (0.076) | 0.021 (0.087) | -0.034 (0.036) | -0.021 (0.041) | 0.010 (0.035) | 0.021 (0.040) | 0.054 (0.064) |
| X² | -0.004 (0.004) | 0.003 (0.007) | -0.003 (0.007) | 0.001 (0.003) | -0.000 (0.004) | -0.003 (0.003) | -0.004 (0.003) | -0.006 (0.005) |
| d97 | 0.012*** (0.003) | 0.013*** (0.004) | -0.010** (0.005) | 0.014*** (0.005) | -0.013** (0.005) | 0.014*** (0.005) | 0.013*** (0.005) | 0.014*** (0.005) |
| ΔCPI | | -0.056** (0.024) | -0.037 (0.038) | -0.071** (0.029) | -0.071** (0.032) | -0.059** (0.026) | -0.067** (0.028) | -0.050* (0.029) |
| OLD | | 0.012*** (0.003) | 0.013*** (0.003) | 0.007** (0.004) | 0.010*** (0.003) | 0.009*** (0.003) | 0.012*** (0.003) | 0.010*** (0.003) |
| MidST | | -0.274** (0.122) | -0.252** (0.108) | -0.227** (0.101) | -0.229** (0.112) | -0.214** (0.092) | -0.228** (0.099) | -0.194* (0.099) |
| AggPr | | -0.008 (0.010) | -0.019 (0.014) | -0.027* (0.015) | -0.016 (0.013) | -0.032** (0.015) | -0.022 (0.014) | -0.040** (0.020) |
| Unemp | | 0.189* (0.108) | | -0.249 (0.167) | | -0.256 (0.158) | | -0.250 (0.166) |
| Emp_f | | | -0.161* (0.092) | | 0.029 (0.119) | | 0.080 (0.114) | |
| SelfEmp | | | 24.534* (14.305) | | | | | 13.463 (14.155) |
| ln(FDI) | | | | 0.004 (0.004) | 0.003 (0.004) | 0.004 (0.004) | 0.002 (0.003) | 0.003 (0.004) |
| XMY | | | | 0.036** (0.018) | 0.025 (0.019) | | | |
| IY | | | | -0.089* (0.051) | -0.055 (0.052) | -0.126** (0.050) | -0.101* (0.054) | -0.108* (0.063) |
| GY | | | | 0.147 (0.294) | -0.026 (0.261) | 0.018 (0.295) | -0.183 (0.255) | 0.008 (0.309) |
| MY | | | | | | 0.083*** (0.032) | 0.077** (0.036) | 0.092*** (0.036) |
| R² | 0.650 | 0.854 | 0.917 | 0.971 | 0.955 | 0.976 | 0.968 | 0.978 |
| DW | 1.86 | 1.86 | 2.00 | 2.07 | 1.97 | 2.13 | 2.03 | 2.18 |
| DF | -1.48 | -4.07*** | -3.90*** | -6.40*** | -5.12*** | -7.46*** | -5.89*** | -7.38*** |

Standard errors in parentheses

***, **, *: 1%, 5%, and 10% statistical significance respectively

6. Conclusions and policy implications

This paper reviews the trends and investigates the determinants of income inequality in Korea from 1980 to 2012. The pattern of different measures of income inequality reveals that income inequality has increased since 2003 and reached the peak in 2009. Income inequality measured by the Gini coefficients decreased somewhat in 2010 and remained at the similar level in 2011. The pattern of the decile ratio also reveals an increasing income inequality

since 2003. The decile ratio for all households (market income and disposable income) consistently increased until 2011, implying a widening income distribution.

The empirical findings are as follows. First, both Kuznets' inverted U-shaped relationship hypothesis between income inequality and economic growth and Barro's hypothesis of U-shaped relationship are not empirically supported. Second, macroeconomic index such as the government spending as a share of GNI (Govt. spending/GNI) was found to be statistically insignificant in affecting income inequality. The statistically significant negative estimate of the investment share in GDP (IY) shows that an increase in investment would decrease the income inequality. Third, the statistically significant positive estimate of the variable for the share of the elderly in working population (OLD) confirms the argument that the rise of aging population, which has been accelerated in Korea recently, is one of the important factors in deepening the income inequality. Fourth, the statistically significant negative estimate of the share of middle school students in school-age population (MidST) affirms the role of educational attainment in alleviating income inequality. Lastly, the share of trade volume in GNI as a measure for openness was found to increase income inequality with statistical significance. This result implies that growth-driven trade expansion policy, including FTA, may not be able to reduce income inequality.

The findings have important policy implications. An increase in transfer income reduces income inequality significantly among all income sources. In order to raise the overall economic status, policy efforts should be exerted to create more stable employment opportunities with better compensation. However, just because an individual is hired at a workplace with better pay does not necessarily mean that income inequality decreases since one also has to examine if that person is already in the higher paying stratus. Nevertheless, despite the possibility of increasing inequality when other people earn more, the benefit of overall increase in economic status from more employment opportunities with better pay will outweigh the potentially increasing income inequality.

In order to reduce overall income inequality, more active policy intervention to increase the transfer payment is called for. The increase of transfer payment will inevitably require an increase in tax. Although this paper does not address the distributive aspects of specific form of tax, there is much research addressing this issue. For example, Hyun and Lim (2005) find that Korea's income tax system can have more redistributive effect by increasing the level of horizontal equity, leading to the equal tax treatment of equal income group. This requires the abolishment of such tax incentives as allowance, deduction and exemption. The nature of tax policy is also important. Despite the government's claim that the recent tax cuts are not for the rich, to the extent that the tax cuts are implemented differently across income distribution in favor of the wealth, the income inequality will persist.

It is encouraging that in 2010, the income inequality measured by the Gini coefficients, decile ratio, quintile ratios, and relative poverty rates generally declined for the first time since 2003. However, there are reasons to believe that this decrease is more likely to be temporary rather than structural. To continue the momentum of declining income inequality, the pressing policy challenge is more than merely implementing stronger economic policies for growth and redistribution. What is urgently called for is to reduce the prevalent uncertainty and to create social and public consensus to share the economic pain and gain. For example, while the government is calling for "sharing growth" with SMEs, business leaders in general are dismissive of the notion of profit sharing. One prominent business leader was even quoted to have protested that the government's proposal of profit sharing reeks of socialism. This is a telling example that shows how hard it is to change the mindset of "those who have" and lead them to share the outcomes.

As Korea becomes more globalized in almost all aspects, the existing inequality structure “becomes both complicated and hardened through the intricate interconnections of domestic and global factors in favor of the reproduction of class privilege” [Koo 2007: 31]. For example, the acquisition of often-coveted skills such as English speaking proficiency or exposure to the environment of advanced countries that are usually attained through study-abroad program at the college level require a sizeable amount of financial support. To the extent that this type of skill and investment are closely related to the future labor market success, the chances for the younger members from the low income households to move up the income ladder and socio-economic hierarchy would remain slim.

In 2008, OECD found that social mobility is generally higher in countries with lower income inequality, and vice versa. As Korea forges its way ahead toward economically developed, socially mature and cohesive country, the findings of this paper shed a light for future policy directions. The current income inequality, if left unchecked, would slow down the social mobility and potentially create class conflicts which will hamper the achievement of the cohesive society. In the long run, this will possibly perpetuate and even exacerbate income inequality, hampering social stability.

Given the importance of transfer income to reduce inequality, some form of tax raise is inevitable. The social consensus to share “the pain and gain” will lighten the potential tax resistance from the rich and induce the poor to be more patient. Conscientious political leadership based on reality and feasibility rather than crowd-pleasing rhetoric is also urgently needed since the public policies based on populism and myopic special interests only retard individual incentives and further exacerbate the income inequality and income polarization. It is also important to note that policies should be supported by sufficient resources and adequate coordination with other relevant policy aspects. If and only if these prerequisites are met, economic and public policies to reduce labor market inequality and polarization will work, and the lower and the poor class will feel the “trickle-down” effect.

As Stockhammer (2010:21) argues, three major building blocks of neo-liberalism – globalization, financialization and rising inequality – are closely intertwined to create the imbalances that caused the most recent global economic crisis. As Korea becomes heavily linked with the world economy, Korea will be increasingly susceptible to global economic turbulence. Although how these turbulences affect inequality in Korea remains uncertain, the existing evidence suggests that the workers and households in the lower tier of income distribution will most likely to bear brunt of the burden. To counter these ramifications of factors and events working against income inequality, the authors recommend active intervention toward better-targeted income support and distribution, employment security and training program, more transparent tax codes.

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